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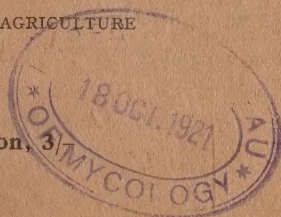
[No. 1.

MONTHLY CIRCULAR OF INFORMATION

ISSUED BY THE
DEPARTMENT OF AGRICULTURE
FIJI

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DEPARTMENT OF AGRICULTURE.

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INTRODUCTORY NOTE.

BY HIS EXCELLENCY THE GOVERNOR.

THE idea of a Government Agricultural Circular, which might eventually develop into a monthly Agricultural Journal or Bulletin, was suggested to me by one of our leading Colonists and welcomed by the Superintendent of Agriculture. There appears to be scope for such a publication. The West Indies have their *Agricultural News*, the Malay States their *Agricultural Bulletin*, the Philippines their *Agricultural Review*. Why not Fiji? But a beginning must be made on a modest scale proportionate to the size of our Agricultural Department. Even a Circular of a few pages involves an appreciable amount of editorial work; and a full-blown Agricultural Journal would be beyond the capacity of the Department as at present constituted.

While the contents will be confined to subjects of agricultural and pastoral interest, it is not proposed that they should be entirely technical. Even a Government publication need not necessarily be dry. Contributions are invited, preferably in the form of short articles, describing methods, raising questions for discussion, suggesting new ideas and setting forth difficulties and experiences in connection with stock-raising and planting—whether it be sugar in the Ba District, bananas on the Rewa, rubber at Waidoi or coconuts in Lau or Taviuni or where the palm-groves make their—

“droned lament
Before Levuka's trade.”

In launching the Agricultural Circular on its career I wish it all success. I hope that it may be a means of furthering that which—whether between individuals engaged in the same industry, or between different industries, or between the Colonists and the Government—is essential to the progress of the community as a whole, namely, *co-operation*.

EDITORIAL NOTES.—JANUARY, 1920.

The strike of Marine Engineers in Australia should provide a further illustration, if one were needed, of the necessity for every precaution being taken to prevent a shortage of food in the Colony. Since the majority of imported foodstuffs are of a perishable nature, large stocks cannot be kept and the withdrawal of steamers from the chief country of supply—Australia—even for a short while can make itself felt. While the Colony will never be absolutely self-supporting in the way of food, it is far too dependent upon imported matter, much of which could, with advantage, be replaced by products of local industry. And indeed the importance of this matter is not confined to the consideration of the vagaries of shipping. A knowledge of the effects in some parts of the group of the storms early last year should encourage provision of facilities for planting up quick growing food crops should necessity arise.

Attention is directed to an article on a disease of the noxious weed (*Clidemia hirta*). Information is desired as to the extent of the attack on the plant in various parts of the group where the weed occurs. Planters and others are asked to supply information as to the appearance of the plant in their districts.

Banana shippers are asked to note that the Regulation requiring bananas to be fumigated before export is still in force. The operation is just as necessary when scale is scarce as when it is very prevalent and the presence of small quantities of live scale, which might be overlooked at the ship's side may seriously affect the future of the industry.

Towards the end of last year, the coconut leaf miner (*Promecotheca Reichii*) seemed to be causing some alarm in the eastern part of Vanualevu and in Tavuni. This insect is generally kept in check satisfactorily by a chalcid parasite. The damage is caused both by the larvæ, which burrow into the substance of the leaflets between the two surfaces, and by the adult beetle which eats narrow stripes from the undersides of the leaflets, generally near the tips. The increase in the damage done by the pest in certain instances in the past has been found to be due to the decrease in the number of the parasites. As these latter increased, the damage done by the beetles became less apparent and finally ceased to be a matter of concern for planters in the affected districts. In the present case, it is likely that events will follow the same course. Planters, however, are advised to have their palms inspected at intervals and to report the results of these inspections to the Agricultural Department. It may be remarked that the damage done by the pest in the previous cases referred to was observed after a storm, and it is worthy of note that the districts from which the trouble is now reported, were among those affected by the storm in March of last year.

Attention of coconut planters and others interested in the copra industry is drawn to the Regulation requiring the masters of vessels leaving places

where the coconut scale is declared to exist, to have their vessels inspected either at Suva, Levuka, or Lautoka. It is feared that this Regulation is not being complied with. The only way by which this may be found out is for persons resident in places free from the scale to exercise the power conferred upon them by Regulations made under the Disease of Plants Ordinance on the 22nd of August last, and to require masters of vessels to produce the certificate of inspection issued to them at one of the ports mentioned. If the certificate cannot be produced, the matter should be reported to the Superintendent of Agriculture or to an Inspector of Constabulary.

With the arrival of the hurricane season, everyone who possesses, or has access to, a barometer probably makes a habit of consulting it more or less regularly. The atmospheric pressure in Fiji is subject to very regular daily variations. Maxima occur at about 10 a.m. and p.m., and minima about 4 a.m. and p.m., the afternoon one being generally much lower than the early morning one. The fact that the pressure is falling during the day (or night) has therefore no particular significance by itself. Attention should always be given to the indications of the barometer about 4 p.m., and if an upward tendency of the pressure is observed by 6 p.m. and the general weather conditions appear to be normal, it is safe to assume that the approach of a serious depression need not be feared immediately. It may be mentioned that the ordinary aneroid barometer is not sufficiently accurate for measuring the actual pressure, but it is usually quite suitable for the purpose of determining whether the pressure is rising or falling. It is a common practise to tap the glass cover of the instrument at the time of making an observation with an aneroid barometer and it is to be noted that an instrument which requires such treatment is not to be relied upon as it needs attention.

AN INTESTINAL PARASITE AFFECTING CATTLE IN FIJI.

BY WAKEFIELD-RAINEY.

Government Veterinary Officer.

In the course of post-mortem examination of cattle in the Suva and Tavuni districts, I have observed, in a large proportion of the carcasses, a nodular affection of the small and large intestines. Except in three cases where the nodules were very numerous and where there was an accompanying inflammation of the mucous lining of the intestine, I formed the opinion that the affection did not in life materially interfere with the nutrition of the animal under examination. In the three severely affected cases however I concluded that the emaciated condition of the animal was partly at least due to the extensive formation of the nodules. It seems evident that the cause of the affection is the presence in Fiji of an intestinal parasitic worm, hitherto considered (so far as I have been able to ascertain) to be indigenous only in the United States of America, and known as *Oesophagostoma Columbianum*, or the *Oesophagostome of Columbia*. The following treatise on the parasite is extracted from the most modern text-book at my disposal; the description corresponds in every detail with my observations on post-mortem examination in Fiji:—

OESOPHAGOSTOMA COLUMBIANUM.

Distribution.—Found commonly in the United States; first discovered in the District of Columbia.

Description.—The worm is thread-like in calibre, white in colour, slightly tapering anteriorly; the mouth is circular and provided with a double row of teeth arranged in a crown-like form; the caudal pouch of the male is saucer-shaped; the tail of the female terminates in a rather sharp point; the male measures about three-fourths of an inch in length, the female about one inch.

Life cycle.—The ovigerous female lays its eggs in the intestinal tract which find their way to the external world with the faeces; the embryos are taken up by the host through the contaminated food and water; upon reaching the intestinal tract they penetrate the mucous membrane and produce nodules which are irregular in outline and vary in size up to a pea; these nodules are found in both small and large intestines; often in badly-infested cases embryos are noted to invade the mesentery, mesenteric lymph glands and liver. The tumour at first smaller in size than a pin-head contains a cyst in which is found a growing embryo coiled in a ring-like shape floating in a colourless fluid; in the second stage the embryo is still in the cyst, but a small quantity of greenish, cheesy pus has accumulated around it; in nodules larger than a pin-head the entire contents are a cheesy mass; the cyst wall is ruptured and the worm is found free, wandering within the capsule; in the larger nodules the cheesy material is quite hard except at the side where the worm is found. Nearing maturity the worm leaves the nodules and becomes sexually mature only in the intestinal tract; the nodule now gradually shrinks in size until it is quite small and filled with earthy material.

Animals infested.—The sheep, goat, and ox.

Parts infested.—Small and large intestines.

Disease produced.—Nodular disease.

Condition produced.—Nodular disease is common in native but seldom if ever found in range sheep. In badly-infested cases the entire intestinal canal may be thoroughly studded with the nodules, which are irregular in outline and push the serous coat out; the nodule lies under the serous covering of the bowel and can be readily told from the tubercle produced by the bacillus of tuberculosis by the fact that the latter is smooth, and that in tuberculosis the lymph glands adjacent to the affected part will be tuberculous; in the infested sheep that are slaughtered the gut is rendered unfit for casings by the disease.

Symptoms.—This form of *oesophagostomiasis* is not so fatal as that caused by the *Oesophagostoma inflatum*; the fleece may appear dry; it may be the cause of partial loss of the wool crop. There may be diarrhoea, general debility, anaemia, sunken eyes, emaciation, and death.

In cattle it does not prove serious in the United States. Only a few nodules are found when these animals are infested; these nodules are usually confined to the small intestines.

Treatment.—The following treatment is recommended to destroy the adult worm in cattle:—Fast the animal for 24 hours, then give one and one-half pounds of salts, followed by from two to six ounces of petrol; for large bunches of stock salt and sulphate of iron constantly before them will also prove beneficial.

The practical conclusions from my observations appear to be:—

(1) That cattle in Fiji appear to be infested more extensively than cattle in the United States, with correspondingly more severe symptoms and results.

(2) That where cattle are found infested it might prove quite impossible to run sheep, in view of the fact that sheep are more liable to attack by this parasite than cattle, so that where cattle are seriously infested sheep would be fatally attacked.

(3) That where cattle are infested extra care should be taken to feed well and to avoid over-stocking, because intestinal parasites especially prey upon ill-nourished and crowded stock.

(4) That meat inspectors and others should make themselves familiar with the difference between the nodules of tuberculosis and the nodules caused by the parasite, since the latter condition in no way affects the suitability of meat for human food. The characteristic green colour of the cheesy material in the parasitic nodules an important help in distinguishing the diseases; the cheesy material in a tuberculous nodule is of a characteristic yellow colour.

Personally, I am not hopeful of the effect of medicinal treatment. The nodules are the difficulty; in them lie the embryos effectually protected from the action of any drug. Where facilities exist, it is well to have rock salt or ground salt mixed with sulphate of iron constantly before the animals, but I consider that the chief reliance should be placed on light stocking and consequently better feeding and the destruction of emaciated animals that will not fatten.

EXTRACTS FROM REPORTS OF INSPECTORS.

COCONUT SCALE (*Aspidiotus species*).

Mr. J. P. Tarby visited the islands of Vatulele and Malolo and reports finding on the former 22 groves of coconut ranging from 1 to 30 palms more or less infested with coconut scale, the groves being quite separate from one another. In 19 of these groves an adjacent "kavika" tree was found to be attacked by scale, and in two of the groves banana plants showed the scale. In response to an explanation by the Inspector of the danger of permitting the scale to exist, the native owners voluntarily agreed to cut down the kavika trees and prune off the affected leaves of the coconuts. The work was completed to Mr. Tarby's satisfaction.

No scale was found upon either of the two Malolo islands. On Malolo lailai, which has been leased by Chinamen, some 30,000 coconuts have been planted.

Along the west and north-west coast of Vitilevu scale occurred on the coconuts, and the usual disinclination on the part of native owners to deal with the matter on their own initiative was observed.

Mr. F. W. Hennings has visited Wakaya where scale was found on a patch of about 20 young coconut palms, which had been transplanted from elsewhere on the island. On visiting the place from which the young nuts had been taken, scale was found on many coconut palms. While proceeding to another grove, scale was seen on kavika and vutu trees. In several instances ladybirds were seen feeding upon the scale insects on affected plants, and many empty scales were seen which appeared to have been due to the work of those beneficial beetles.

In another part of the island, a small grove of coconut palms, growing in a sandy swamp at sea-level and surrounded by dense bush, was particularly badly attacked by scale, the infestation extending in many instances to the fruit. The scale was also seen on a common tree in the bush surrounding the grove. Ladybirds were observed on the scale-infested leaves and fruit. No scale could be found at the landing place near the principal anchorage.

It appears that bananas and kumalas were taken to Wakaya about the middle of last year from a district in which coconut scale was very prevalent, and the former may have been the means of introducing the scale to the island. The distribution, however, of the scale in the different groves of coconuts points to a much earlier introduction.

Work of dealing with scale infested-areas was commenced immediately.

Further inspection was made of scale-infested areas on Ovalau. At Loreto no scale was seen on coconuts, the palms, which had been attended to under instructions given on the occasion of the last visit, showing no sign of the reappearance of the pest. Nearby, however, a vutu was observed carrying the scale. It was at once destroyed.

One palm in a small cultivation belonging to an Indian was seen to be affected with scale. The necessary treatment was given during the Inspector's visit. Instructions were issued for further treatment in the case of some native cultivations in this neighbourhood.

Mr. Hennings visited a plantation owned by an European who complained that some coconut palms treated in accordance with the law had died in consequence. The Inspector considers that there appeared to be no reason for this complaint except, perhaps, in the case of two palms, which, however, were very much below the average condition of development attained by other palms set out at the same time. It may be remarked that the treatment prescribed by law—*i.e.*, the removal of diseased leaves—is merely anticipating nature, for no badly attacked leaf is of use to the plant.

The natives at Bureta have not yet completed the work of removing attacked leaves, and instructions were issued regarding certain patches of palms.

Mr. Hennings visited the islands of Gau, Nairai and Batiki. At the first named, two European plantations and the cultivations of 10 native towns were inspected. No coconut scale was found either on coconuts, bananas or other plants.

At Nairai the cultivations of 5 towns were inspected without finding the scale.

The four towns on Batiki were inspected and no scale was observed.

The following plants, in addition to coconuts and bananas, were carefully examined for scale wherever met with:—Papaw, kavika, vutu, yaqona, mango and beli.

Ladybirds were in evidence on nearly every coconut grove examined, and they appeared to be most plentiful at Nairai. Serious losses are reported in these islands in the crop of nuts, caused by rats. At Nairai and Batiki young nuts gnawed open at one end littered the ground beneath the palms in places, the greatest damage being observed at Nairai, where it is estimated that 30 per cent. of the crop is lost in some areas. The natives consider that the rats have been increasing in numbers lately.

While Mr. Hennings was at Nairai a cutter was found to have arrived, the master of which admitted having come from Vitilevu and had no certificate of inspection as required by law. The Inspector visited the vessel and found no scale-infested material, but took the necessary note for subsequent action.

The leaf miner (*Promecotheca Reichii*) was seen to be doing a great deal of damage to coconut leaves on all these islands visited. On some palms practically every leaf was attacked.

Mr. M. A. Forsyth, at Levuka, reports that the masters of two vessels were proceeded against before the District Commissioner for failing to have their vessels inspected as required by law before proceeding to places where the coconut scale is not known to exist. Convictions were obtained in each case and fines of five pounds were imposed.

INSPECTION OF VESSELS.

The following list shows the numbers of vessels reporting for inspection^o under the coconut scale regulations, and the number of cases in which material had to be destroyed:—

	Suva.		Levuka.		Lautoka.	
1919.	Vessels Inspected.	Destruction of Material.				
October	10	5	25	9
November	14	4	12	3
December	6	2	35	15	7	2

BANANAS.

The Inspector of Produce reports that the bananas exported during 1919 were as below:—

	<i>Bunches.</i>	<i>Cases.</i>
To Sydney	70,328	17,785
To Melbourne . . .	46,917	26,523
To Auckland	24,051	192,405
Totals . . .	141,296	236,713

Equivalent to 614,722 bunches.

In previous years the totals were:—1916, 1,651,366 bunches; 1917—1,354,622 bunches; 1918—1,055,608 bunches.

The serious falling-off is attributed chiefly to the strikes in Australia and the effects of the influenza, both here and in Australia, where its presence has necessitated the imposition of quarantine regulations which has interfered with shipping arrangements.

A DISEASE OF *CLIDEMIA HIRTA* IN THE LOWER
REWA DISTRICT.

BY H. W. SIMMONDS, F.E.S., and C. H. KNOWLES.

Acting upon information given by Mr. Corbett, visits were paid to his estate, and to those of Mr. Koster and Mr. Witherow adjoining, to investigate a disease which was said to be killing the weed *Clidemia hirta*. A visit was also paid to the old coffee plantation of Mr. F. Parr, where the weed is said to have first appeared in this country. In addition, the whole of the road between Suva and Rewa was carefully worked, whilst Lami estate and the neighbourhood of Flagstaff Hill were also examined. With the exception of the Lami estate, the whole of this area was found to be affected in varying degrees of intensity, the diseased condition being almost absent from those patches found growing where the soapstone outcropped and decomposed into its characteristic black soil. Where the poor red soil overlies the soapstone, the disease was frequently bad, but on the richer alluvial flats it was generally absent although markedly present on one of Mr. Corbett's flats. On the lands covered with bush the disease did not seem to have made so much headway as on the open country, but here again on the old coffee estate now reverted to bush a certain amount of affected material was seen. The outcrop of soapstone upon which Suva stands seems to isolate at present the affected area which all lies to the eastward and no disease has as yet been observed along the southern coastal area in which *Clidemia* is so abundant.

APPEARANCE OF DISEASED AREAS.

The affected patches were very apparent, generally occurring on hillsides or tops, where the plants had the appearance of being very badly windswept or even at times of having been over-run by fire. In other places isolated patches, frequently circular, showed up as a mass of dead twigs amongst the surrounding masses of green vegetation. Such patches were almost always clear cut as if radiating from a centre of infection.

APPEARANCE OF DISEASED PLANTS.

Individual plants were found upon examination to be dying back from the tips. In many cases such death had gone right back to the roots, but in others fresh shoots had been thrown out from the lower buds or even from the roots, and these in turn would frequently be found to be dying off. All stages were to be found from slightly affected plants to others quite dead. Upon close examination the dead twigs were often found to show traces of insect borings, whilst both living and dead tissue showed the presence of fungi. The roots were next examined and they were found to be in a most unhealthy condition. As compared to healthy plants there was a great scarcity of the tiny rootlets, in some very bad cases hardly any being present. Those that remained had many small nodules scattered through them, whilst the larger roots also were frequently swollen and had patches of abnormal growth. Both roots and nodules were more or less stained sometimes being quite black and rotten, so that the outer portion stripped off when being pulled up. When quite small the nodules were generally whitish with a small orange-coloured stain in the central woody tissue, which when the nodule became older, became a perforation, stained at the edges, and the whole growth would become discoloured.

CAUSES OF DISEASED CONDITION OF THE PLANT.

As insect agency had been suggested as the primary cause of the death of the plants, considerable attention was given to the previously mentioned borings and a very large number of twigs were opened. In a number of these the borings of beetle larvæ were found and a few of the larvæ themselves were discovered as was also one specimen of the beetle, which will later be sent away for identification. In no single instance however were these borings found to have penetrated the living tissue, whilst a large number of twigs showed no signs of having been attacked at all. Thrips, a pseudoscorpion, and two species of ants were also found to be present, but these would all be secondary tenants, entering by the hole made by the beetles in their exit. As the dead twigs occurred in narrowly-marked patches, and in many no traces of insect agency could be found, we concluded that the beetle did not attack the plants until after the death of the tissues it lives on. We, therefore, turned our attention to the roots as the more probable site of the primary cause.

MICROSCOPIC EXAMINATION.

A large number of slides were prepared from different portions of the roots and stems and throughout the whole, quantities of fungus mycelium were found. The form and appearance of the nodules suggested the attack of nematode worms and prolonged search was made for the worms, but no free swimming forms were found. However, large numbers of nematode eggs were discovered in specimens from several different districts and their form and the method of distribution suggested the genus *Heterodera*. In this nematode, the female takes a sac-like form and the eggs develop within her body until the young worms have hatched, when they generally leave the plant for another host, but occasionally remain within it, working their way to fresh tissue. Traces of the skin of the female seemed to be present in many cases, but attempts to isolate a complete undamaged female failed. The males of this genus are not often found and probably are only to be seen at certain seasons. The young, since they leave the plant generally as soon as hatched, are not often met with. Slides of these eggs have been made and will be sent in due course to specialists for specific identification. A small fragment of what might have been the cast skin of a mite was observed, but no further examples being met, this was probably an accidental presence.

Throughout the whole the roots showed the presence of much mycelium, smoky and septate lying amongst the decomposed tissue and especially in the neighbourhood of the nodules. At several places many thick-walled oval resting spores, probably some member of the *Peronosporaceæ* were seen, and at others spherical black spore cases were found. These latter, however, so far as those examined were concerned, were all immature, but there were indications that they were perithecia of some member of the *Ascomycetæ*, many members of both these families are parasitic, and it is probable that one, or both these fungi are a heavy contributing cause in the destruction of the roots.

Members of the *Peronosporaceæ* give rise to other kinds of spores besides the resting ones, these others being produced at the tips of hyphæ which project into the air, and none of them have as yet been found. A few spores of what appear to be a species of *Pestalozzia* were seen in one case, but no members of this genus are root fungi, whilst prolonged examination failed to reveal further examples.

The effect of the destruction of the roots would of course be the immediate death of the rest of the plant, but gradual destruction of the former would probably show first in the more delicate tissues at the extremities, which would thus die back from the tips downwards. As the disease advanced the supplies of material taken up by the roots; even though the latter were themselves diseased, would then be available for a much diminished area of plant matter above ground, and so might enable new buds to be developed, as appears to have been the case in this instance, probably coinciding with the periods of more favourable growing conditions.

Fruit bodies of fungi were found on the bark of dead stems, but in all cases seen these had matured, and their spores had been disseminated so that it was not possible to determine whether these were likely to be those of parasites or saprophytes. The diseased condition of the roots would certainly render the upper portion far more susceptible to the attack of fungi, and these in turn would hasten, and might be the actual cause of the death of such portions as lay beyond.

CONCLUSIONS.

Under these circumstances we have come to the conclusion that the diseased condition of the plant is first brought about by the attacks of nematodes, probably a species of *Heterodera*. That the wound thus made provides entrance for fungi which are likely to be more serious in their effects than the nematodes. These fungi were far more abundant in specimens taken from Mr. Koster's estate than in those from elsewhere, and it was here also that the disease was most marked in its effects.

EXPERIMENTS.

With a view to seeing if some of our crops are likely to be affected, specimens of *Clidemia* showing well-marked symptoms of the disease have been placed in close proximity to plants in the plots of Para rubber, cocoa, coffee, citrus plants and coconuts at Nasinu. Even, however, should none of these plants show signs of being attacked, such evidence will be purely negative, and of doubtful value as an indication as to the advisability of making general use of the disease for the control of *Clidemia* throughout the Colony. A species of *Heterodera* (*H. radicola*, Mull) is a serious enemy to certain cultivated crops, tomatoes, sugar-cane, cucumber, coffee and certain citrus fruits being known to suffer from its attacks. The nematode under report may, however, prove not to be this species, in which case it is likely to be more confined in its food habits.

PRACTICAL UTILITY.

From the practical point of view there is no doubt that in the areas affected *Clidemia* is dying out, and valuable crops such as paspalum and reeds are now replacing it. This applies especially to Mr. Koster's property. Land which three or four years ago was, we are informed, under dense growth of this weed has now returned to grass, with only a few sick plants here and there, so that it is probable that the *Clidemia* seeds do not lie dormant in the soil for very long. The diseased plants dying as they do from the tips downwards yield few if any seeds, a fact which is of considerable importance.

At present it is the weed on the poorer classes of land that is principally affected, but it is on such land that the destructive work is most valuable, since the cost of clearing the weed away is prohibitive, whereas on the better

class lands it does pay to clear the weed off artificially. Land so recovered by the gradual replacement of the weed by grasses, etc., would, not having been subject to denudation, naturally retain most of the good qualities which it originally possessed.

We might also suggest that where the *Clidemia* is badly attacked, its destruction in some places could be hastened comparatively inexpensively by cutting narrow lanes through it, throwing the cut material onto the living plants, when with the large amount of dead material present it should be possible under favourable conditions to get a fire through it satisfactorily.

It should be pointed out here that the use of nematodes or root fungi for the control of noxious weeds is probably about the most dangerous method that can be employed, as should such controlling agency transfer its attack to plants of economic importance, it is almost impossible to recognise the attack until it has proceeded too far to be checked. As an illustration of this danger it may be mentioned that in Fiji one species of nematode—*Tylenchus similis*—has done great damage to bananas, whilst the fungus *Ustilina zonata* has been found on roots of Para rubber, mango, hibiscus and citrus plants, and *Hymenochaete noxia* on Para rubber, cocoa and the rain-tree with very serious results.

ACKNOWLEDGMENTS.

Thanks are due to Mr. E. Corbett, of Nacalia, and Mr. C. Koster, of Navutoka, for much assistance and kind hospitality given during this investigation.

BREEDS OF CATTLE IN FIJI.

BY WAKEFIELD RAINEY,
Government Veterinary Officer.

In the course of my inspections the question of the most suitable breed of cattle for Fiji frequently arises; consequently I have given the matter very close attention.

In the matter of dairy cattle the choice is fairly open, but personally I favour the Holstein breed.

The red Devon shorthorn also deserves further trial.

While fully admitting the merits of the Durham roan shorthorn, I have observed that the stock from this breed, under any but the best conditions of feeding, tends in those parts of Fiji I have visited to degenerate after a few generations into a white beast of poor stamina and small resistance to tuberculosis.

It is perhaps premature and rash to give this opinion, but such up to the present has been the result of my observations, and I feel it my duty to record it.

In the matter of beef-cattle I unhesitatingly pronounce in favour of a cross between the Zebu (or Indian ox) and the Hereford or Polled Angus for the purposes of Fiji.

In this view I am supported by the opinion of Mr. E. Morgan, M.R.C.V.S., D.V.N., of Puerto Cabello, Venezuela, who states in a recent article on the subject contributed to the *Venezuelan Times* (see *The Veterinary Journal* for October, 1919).

"Most of the fat cattle arriving here (Puerto Caballo), which have been crossed by the Zebu, appear to have Hereford blood in them. For meat purposes a cross between the Zebu and the Hereford gives excellent results. While the Zebu has defects in one or other points such as flat ribs, the Hereford is *vice versa* and corrects the faults, and the resulting cross is most satisfactory.

"The result of a cross between the Zebu and the Hereford or Angus gives a strong healthy beast especially fit to live in the tropics."

To this I would add that although I am not yet in a position to produce full proof that the half-bred Zebu in Fiji is less liable to tuberculosis than other breeds nevertheless, in so far as the cross is hardier and better suited to tropical conditions, to that extent it will be found less susceptible to disease in general. Consequently there is good reason for assuming that it will prove to be more resistant to tuberculosis than are cattle bred entirely from European strains, and the evidence already obtained by me strengthens that assumption.

As a general rule I would recommend planters to breed for beef; the production of dairy cattle from pure European breeds is a difficult and delicate business and, excepting for purposes of strict dairy farming, the larger amount of milk obtained from these strains is discounted by their greater liability to tuberculosis; their inability to maintain condition on poor grazing land; and their tendency to degenerate.

DEPARTMENTAL NOTES.

Mr. M. A. Forsyth, Inspector of Plantations, has been stationed temporarily at Levuka.

Lieut.-Col. Rainey, O.B.E., M.R.C.V.S., Government Veterinary Officer, has proceeded to Colo East on a visit of inspection, at the conclusion of which he will visit the northern districts of Vitilevu.

Mr. C. H. Wright, M.A., F.I.C., Government Agricultural Chemist, has been granted extension of leave until 7th March, 1920.

Mr. F. W. Hennings, Inspector of Plantations, has proceeded to the north of Vitilevu in connection with inspection for the noxious weed Noogoora Burr.

Mr. J. S. MacNair, Sanitary Inspector, and Mr. A. E. Nicholls, Sanitary Inspector, have been appointed, temporarily, Inspectors of Stock for Suva and Rewa districts respectively.

Mr. J. W. Philpott, who has held the post of Inspector of Produce since January, 1907, retired from the service on pension on 16th January. Mr. Philpott has administered the regulations in connection with the export of fruit with conspicuous tact and ability and to his indefatigable efforts is to be ascribed the re-organisation of the banana shipping industry since 1907. The fact that banana shippers specially asked that this officer's services should be retained long past the time when Civil Servants are usually required to retire, is evidence as to the success that has attended Mr. Philpott's work. The duties of the post have been assumed by Capt. N. W. Faddy, M.C.

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